

HR-219 Settlement at Culverts

Key Words: Box culverts, Pipe culverts, Culvert replacement, Pavement surface at culverts

ABSTRACT

Past construction methods have resulted in the need for leveling wedges of asphaltic cement concrete or mud jacking at locations where a reinforced concrete box culvert was replaced with a pipe culvert.

With the restraint of limited funds, more reconstruction, restoration, repair and resurfacing projects will be constructed. This will result in using existing pavements with trench replacement of small box culverts.

The installation of culverts in trenches does not provide adequate space for compaction equipment other than hand tampers or small vibratory plate compactors. To increase the size of the trench and increase the size of the full depth pavement repair is expensive.

The objective of this research is to develop and evaluate various methods of backfilling adjacent to culverts to reduce the need for future leveling or mud jacking to maintain a smooth pavement surface.

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Of all five methods of backfill, the Class "C" Bedding with Moisture Control is the only location which would have required any maintenance leveling. Of all methods of backfill, the backfill with the excavated soil was the most expensive method used.

The Class "C" Stone Backfill had the least settlement of the backfill methods. When considering the cost of material and time used, the total cost of the Class "C" Stone Backfill was nearly the same as the soil backfill.

The most cost effective method with a minor amount of total settlement was the flowable mortar backfill. In fact, the contractor who installed these culverts indicated that he would suggest flowable mortar backfill in similar situations on future projects.

On this research project, more continuous Iowa DOT inspection was provided than is normally available

for other culvert pipe installations. This forced the contractor to follow specifications and plans more rigidly than if an inspector was only periodically checking the operation.